REMARKS

Election/Restriction

The Applicant affirms the election of the first species of a method of forming an interconnect, claims 9 – 13, without traverse. Claims 14 – 16 of the second species of using a machine-readable medium that provides instruction are cancelled.

Claim Rejections – 35 U.S.C. § 103

The Examiner has rejected claims 9-10 and 12-13 under 35 USC 103(a) as being unpatentable over Lin (U.S. Patent No. 6,307,268) in view of Shimizu et al. (U.S. Patent No. 6,242,808). The Examiner has rejected claim 11 under 35 USC 103 as being unpatentable over Lin ('268) in view of Shimizu et al. ('808) as applied to claims 9-10 and 12-13 above, and further in view of Wada et al. (U.S. Patent No. 5,629,236). The Applicant respectfully traverses. The cited references, either individually or in combination, do not teach or render obvious all of the Applicant's claimed elements. In particular, the cited references do not teach the element of independent claim 9 of "providing at least one dummy via plug disposed underneath the at least one first interconnect and proximate to the metal plug to provide a reservoir for metal ions to reduce a build-up of electromigration-induced mechanical stress." In contrast, Lin teaches a plurality of generally regularly spaced dummy refractory plugs 11 along an aluminum interconnect wire 10 as illustrated in Figures 2 and 3. The dummy refractory plugs 11 are positioned at regular intervals along the aluminum interconnect wire to absorb the mobile aluminum atoms, vacancies, or defects, that are transported along the aluminum interconnect wire due to the stress-induced migration during a rapid temperature ramp (Col. 4 lines 44 –49). As is apparent from Figures 2 and 3 that the dummy refractory plugs 11 are not disposed underneath an interconnect and *proximate* to a metal plug (via) 2. As defined by the Applicant's specification, and illustrated in Figure 1, "proximate to a metal plug" means that the dummy via plug 15 is directly below the metal plug 1. The purpose of the dummy refractory plugs 11 of Lin is to draw the aluminum atoms, vacancies or defects away from the via 2 to prevent damage to the via 2 caused by stress-induced migration during a rapid temperature ramp and not to provide a reservoir for metal ions to reduce a build up of electromigration-induced mechanical stress that is found at bends in copper, silver, or gold interconnects such as those claimed by the Applicant. The Applicant places at least one dummy via plug underneath the interconnect and proximate to a metal plug because this is the particular type of area where electromigration-induced mechanical stress occurs in copper, silver, or gold interconnect bends. Additionally, the thermally-induced mechanical stress of Lin is caused by rapid changes in temperature of the aluminum interconnect wires during fabrication in contrast to the electromigration-induced mechanical stress that occurs during operation of circuit when current is passed through the interconnect wires and vias. Therefore, not only does Lin fail to teach providing at least one dummy via plug disposed underneath the at least one first interconnect and proximate to the metal plug, but Lin also fails to render obvious the Applicant's claimed elements of providing at least one dummy via plug disposed underneath an at least one interconnect and proximate to a metal plug to provide a reservoir for metal ions to reduce a build-up of electromigration-induced mechanical stress because the thermally-induced stress of the aluminum interconnect lines of Lin is different from the electromigration-induced mechanical stress claimed by the Applicant. Shimizu also fails to teach providing at least one dummy via plug disposed underneath the at least one first interconnect proximate to the metal plug to provide a reservoir for metal ions to reduce a build-up of electromigration-induced mechanical stress. Wada teaches forming a dummy plug that is not connected to another wiring layer at a predetermined position of a multi-level *aluminum* wiring structure. Wada fails to describe the predetermined position of the dummy plug and therefore fails to teach providing at least one dummy via plug disposed underneath an interconnect and proximate to a metal plug. Therefore, the Applicant respectfully submits that the Applicant's independent claim 9 and the claims 10 – 13 that depend upon and incorporate the limitations claim 9 are not taught or rendered obvious by the cited references, either individually or in combination.

If there are any additional charges, please charge them to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: 8/3, 2004

HMolleur
Heather M. Molleur (Reg. No. 50,432)

Customer No. 08791.
12400 Wilshire Blvd.
Seventh Floor
Los Angeles, CA 90025-1026
(408) 720-8300